

L Number	Hits	Search Text	DB	Time stamp
1	482	metal adj capacitor	USPAT; US-PGPUB	2002/09/19 14:47
2	381	(metal adj capacitor) and @ad<=20000818	USPAT; US-PGPUB	2002/09/19 14:11
3	54	((metal adj capacitor) and @ad<=20000818) and trench	USPAT; US-PGPUB	2002/09/19 14:12
4	279	metal adj capacitor	EPO; JPO; DERWENT; IBM_TDB	2002/09/19 14:20
5	11	(metal adj capacitor) and trench	EPO; JPO; DERWENT; IBM_TDB	2002/09/19 14:20
6	7460	capacitor and trench 438/253-256,396.ccls.	USPAT; US-PGPUB	2002/09/19 15:19
7	5911	(capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818	USPAT; US-PGPUB	2002/09/19 15:21
8	4311	((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode	USPAT; US-PGPUB	2002/09/19 15:05
9	3506	((((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode) and dielectric	USPAT; US-PGPUB	2002/09/19 15:05
10	772	(((((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad	USPAT; US-PGPUB	2002/09/19 15:05
11	6011	capacitor and trench 438/243,244,386,387.ccls.	USPAT; US-PGPUB	2002/09/19 15:04
12	4687	(capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818	USPAT; US-PGPUB	2002/09/19 15:04
13	3315	((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode	USPAT; US-PGPUB	2002/09/19 15:22
14	2616	((((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode) and dielectric	USPAT; US-PGPUB	2002/09/19 15:22
15	643	(((((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad	USPAT; US-PGPUB	2002/09/19 15:06
16	3	(((((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad) not (((((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad)	USPAT; US-PGPUB	2002/09/19 15:07
18	1976	(((((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode) and dielectric) not (((((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad)	USPAT; US-PGPUB	2002/09/19 15:12
20	1144	(((((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode) and dielectric) not (((((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad)) and level	USPAT; US-PGPUB	2002/09/19 15:12
21	39	(((((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode) and dielectric) not (((((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad)) and level) and (multiple with level)	USPAT; US-PGPUB	2002/09/19 15:22
22	7208	capacitor and trench 257/306,301,324,760.ccls.	USPAT; US-PGPUB	2002/09/19 15:21

23	5763	(capacitor and trench 257/306,301,324,760.ccls.) and @ad<=20000818	USPAT; US-PGPUB	2002/09/19 15:22
24	4045	((capacitor and trench 257/306,301,324,760.ccls.) and @ad<=20000818) and electrode	USPAT; US-PGPUB	2002/09/19 15:22
25	3101	((((capacitor and trench 257/306,301,324,760.ccls.) and @ad<=20000818) and electrode) and dielectric	USPAT; US-PGPUB	2002/09/19 15:22
26	66	(((((capacitor and trench 257/306,301,324,760.ccls.) and @ad<=20000818) and electrode) and dielectric) and (multiple with level)	USPAT; US-PGPUB	2002/09/19 15:23
27	28	(((((capacitor and trench 257/306,301,324,760.ccls.) and @ad<=20000818) and electrode) and dielectric) and (multiple with level)) not ((((((capacitor and trench 438/243,244,386,387.ccls.) and @ad<=20000818) and electrode) and dielectric) not (((((capacitor and trench 438/253-256,396.ccls.) and @ad<=20000818) and electrode) and dielectric) and pad)) and level) and (multiple with level))	USPAT; US-PGPUB	2002/09/19 15:23

	U	1 [1]	Document ID	Issue Date	Pages
1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6452251 B1	20020917	31
2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6329234 B1	20011211	13
3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6166423 A	20001226	18

	Title	Current OR	Current XRef
1	Damascene metal capacitor	257/532	257/301; 257/306; 257/310; 257/774
2	Copper process compatible CMOS metal-insulator-metal capacitor structure and its process flow	438/210	257/301; 257/306; 257/528; 438/241; 438/253
3	Integrated circuit having a via and a capacitor	257/532	257/535

	Retrieval Classif	Inventor	S	C	P	2	3	4	5
1		Bernstein, Kerry et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		Ma, Ssu-Pin et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		Gambino, Jeffrey P. et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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TITLE: Formation of metal capacitor useful as decoupling capacitors involves forming dual damascene patterns including trenches and holes in third and second insulators

----- KWIC -----

Formation of metal capacitor useful as decoupling capacitors involves forming dual damascene patterns including trenches and holes in third and second insulators

NOVELTY - A metal capacitor is formed by preparing copper wires, sealing layer, and second insulator on first insulator, and forming an opening on the second insulator. The two metal layers and the dielectric layer are removed, and a third insulator is formed. Dual damascene patterns including trenches and holes are formed in the third and second insulators.

DETAILED DESCRIPTION - Formation of a metal capacitor (140) involves sequentially forming first and second copper (Cu) wires (104a, 104b), sealing layer (108, 132), and second insulator (106) on first insulator (102). An opening is formed on the second insulator and sealing layer to expose the first copper wire. A first metal layer (114), dielectric layer (116), and second metal layer (118), in sequence, are conformally formed in the opening. The first metal layer, dielectric layer, and second metal layer

are removed to
expose the second insulator. A third insulator (110) is
formed on the second
insulator and second metal layer. Dual damascene patterns
including trenches
and holes are formed in the third and second insulators. A
third copper wire
(130a) and fourth copper wire (130b) are formed in the
trenches. A first
copper plug (128a) and a second copper (Cu) plug (128b) are
formed on the
holes. The second metal layer is connected with the third
Cu wire through the
first Cu plug, and the fourth Cu wire is connected with the
second Cu wire
through the second Cu plug.

USE - The method is for forming a metal capacitor useful as
decoupling
capacitors for providing voltage regulation and noise
immunity for power
distribution. The capacitor is also useful in
analog/logic, analog-to-digital,
mixed signal, and radio frequency circuits.

DESCRIPTION OF DRAWING(S) - The drawing shows a metal
capacitor formed by the
method.

FORMATION METAL CAPACITOR USEFUL DECOUPLE CAPACITOR FORMING
DUAL PATTERN TRENCH
HOLE THIRD SECOND INSULATE

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